WHAT IS CLAIMED IS:

1.   A memory device comprising:

a magneto-resistive random access memory (MRAM);

a cache comprising a volatile memory; and

a decoder configured to translate referenced addresses to physical addresses to access data and pass the data between the MRAM and the cache and between the cache and a controller.

2.   The memory device of claim 1, wherein the decoder translates referenced addresses from the controller to physical addresses in the MRAM and the cache.

3.   The memory device of claim 1, further comprising:

an error detection and correction circuit electrically coupled to the cache and the MRAM, the error detection and correction circuit configured for error correction encoding and decoding of the data.

4.   The memory device of claim 1, wherein the cache comprises static random access memory.

5.   The memory device of claim 1, wherein the cache comprises dynamic random access memory.

6.   The memory device of claim 1, wherein the cache, the MRAM, and the decoder are fabricated on a single semiconductor substrate.

7.   The memory device of claim 1, wherein the cache comprises one of a unified cache and a segmented cache.

8.   The memory device of claim 7, wherein the segmented cache comprises a data segment and an instructions segment.

9.   A memory device comprising:

a magneto-resistive random access memory (MRAM);

a volatile memory; and

a virtual memory controller configured to pass data between the MRAM, the volatile memory, and a host.

10.   The memory device of claim 9, wherein the controller passes data between the volatile memory and the host based upon requests from the host.

11.   The memory device of claim 9, wherein the volatile memory comprises a static random access memory.

12.   The memory device of claim 9, wherein the volatile memory comprises a dynamic random access memory.

13.   The memory device of claim 9, wherein a portion of the MRAM comprises a page file.

14.   A method for reading data or instructions from a memory device that comprises a magneto-resistive random access memory (MRAM) coupled to a cache comprising:

receiving a request from a controller to read data from the MRAM;

determining if the requested data is located in the cache;

passing the data from the MRAM to the cache if the data is not located in the cache; and

passing the data to the controller from the cache.

15.   The method of claim 14, further comprising:

error correction decoding the data from the MRAM.

16.   The method of claim 14, wherein the request comprises reference addresses, the method further comprising:

translating the reference addresses to physical addresses.

17.   A method for writing data to a memory device that comprises magneto-resistive random access memory (MRAM) coupled to a cache comprising:

receiving a request from a controller to write data to the MRAM;

determining if a memory block where the data is to be stored is located in the cache;

passing the memory block from the MRAM to the cache if the memory block is not located in the cache;

passing the data from the controller to the cache; and

passing the data from the cache to the MRAM.

18.   The method of claim 17, further comprising:

error correction encoding the data from the cache.

19.   The method of claim 17, wherein the request comprises reference addresses, the method further comprising:

translating the reference addresses to physical addresses.

20.   A portable electronic device comprising:

a processor; and

a semiconductor memory device comprising:

a magneto-resistive random access memory (MRAM);

a cache comprising a volatile memory; and

a control and address decoder configured to control the passing of data between the MRAM and the cache and between the cache and the processor.

21.   The portable electronic device of claim 20, wherein the portable electronic device comprises a display.

22.   The portable electronic device of claim 20, wherein the portable electronic device is one of a personal digital assistant, a cellular telephone, a digital music player, a personal organizer, and a digital camera.